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First Report of a *Cyclops* Lamb Associated With a Normal Twin Lamb From Iran

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Abstract

A four- year-old Moghanian breed ewe was admitted to the large animal veterinary clinic, University of Tabriz due to dystocia. During obstetrical examination, it was revealed that the cervix has been closed firmly and vagina protruded about 5 cm through the vulva (vaginal prolaps). Based on clinical findings and for saving the dam and lamb(s), the cesarean section was done. A normal alive female lamb twin to a monster dead male was delivered. According to the facial deformity, the monster twin was diagnosed as *Cyclops* lamb. This is the first report of a *Cyclops* lamb's giving birth twine to a normal lamb from Iran.

Keywords: *Cyclops*, monster, lamb, Moghanian ewe

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Introduction

The *Cyclops* was represented as one-eyed giants in Greek mythology. According to the Greek epic poet, Hesiod, the *Cyclops* were the sons of *Uranus* (Sky) and *Gaia* (Earth), and their names were *Argos, Sterops*,and *Brontes*. *Cyclops, titans, and Hecatonchires* may all have been children of *Uranus* and *Gaia,* but *Uranus* had the nasty habit of keeping all his children imprisoned in *Gaia* (Gill, 2009).

In medical terminology, *Cyclopia* is a teratology (meaning birth defect) wherein the development of the face of the human or animal is so affected that it has only one eye towards the center of its head (Andrabi, 2007) **.** It is described as an absence of the midline facial structures and the development of a proboscis consisting of the fusion of the nasal chambers below a cyclopic eye (Cooper *et al*., 1998). This developmental malformation which occurs in sheep, cattle, human, pig and cat has been reported from several countries including the United States of America (Beachy, 2005), Australia (Hughes *et al*., 2005), Canada (Gaffield and Keeler, 1996), China (Pescovitz, 2008), United Kingdom (Fidler *et al*., 1983), Russia (Lucian, 2006) and India (Anitei, 2008). However, giving birth of a Cyclops lamb twin to a normal lamb has never been reported from these countries.

In sheep, the malformation is caused by ingestion of plants of *Veratrum* species. This species includes *Veratrum californicum* (Fals or Western Hellebore), *Veratrum viride* (Wild Corn & Skunk Cabbage) and *Veratrum japonicum* (Corn Lily). All portions of the plant are toxic to the ewe and can produce clinical symptoms. Cyclopia of the fetus occurs if the plant is ingested during the 12-14th day of gestation. The ewe only needs to ingest 1.8 g of dried *V. californicum* to have resulting toxic effects but a great deal less is required for the malformation of the fetus. The ewe reproduction abilities will also be affected long term, 10-15% of ewes that have cyclopean lambs will be unable to reproduce the following year (Beasly, 1999).

The plant contains teratogenic alkaloids including Cyclopamine, vetatramine, cycloposine and jervine (Beasly, 1999).These alkaloids negatively affect the normal cholesterol and Sonic Hedgehog signaling pathway that is the primary signal for the development of a cell (Strauss, 1998).

This paper describes the giving birth of a *Cyclops* lamb twin to a normal lamb for the first time from Iran and discussing about the probable causes of this birth defect.

Case History

A four-year-old Moghanian breed ewe was admitted to the large animal veterinary clinic ,University of Tabriz. According to the owner's data, the ewe was suffering from the vaginal prolaps during the last recent days, but the urgent problem was dystocia. In spite of beginning the myometrial and abdominal contractions since three hours ago, the animal was unable to vaginal delivery.

She already had two successful parturitions and was fed by grazing in the pasture and sometimes manually with hay and barely.

A complete obstetrical examination revealed that the cervix had been closed firmly and protruded about 5 cm from the vulva. Based on clinical findings and for saving the dam and its lamb(s), we decided to do the cesarean section as a choice. The animal was restrained in right lateral recumbency position. After shaving and disinfection of the left lower flank, operation was performed under local anesthesia (by subcutaneous linear infiltration of a total volume of 10 ml Lidocaine 2% manufactured by Pasteur Institute, Iran), (Fig. 1).

Results and Discussion

Upon making an incision in the great curvature of the left uterine horn, a normal and alive female lamb was delivered. At inspection of the right horn, a dead male monster (*Cyclops*) lamb was found which had only one eye in the center of its face. Also, a fleshy process was hanging from its forehead and its

body seemed smaller than the normal lamb. Nose was absent and there was a protruded tongue from the mouth. In overall view, the face looked like a monkey's face (Fig. 2).



Figure 1: Location of the cesarean section (left lower flank) with two lambs.



Figure 2: The male *Cyclops* twin lamb

There are several categories of teratogenic agents which can cause fetal deformities and developmental problems. They include fever, viral or bacterial infections and chemicals (environmental and hormonal), both man made and natural .Structural malformations can also

be the result of a genetic alteration of known or unknown cause. A teratogenic agent must act upon the fetus during the vulnerable stage of development to make the malformation. There are five critical periods of development in which the outcomes can vary significantly (Schmutz, 2003).

Teratogenic agents can follow several pathways which indirectly or directly result in developmental defects. A developmental toxicant can cause abnormal development through any one or a combination of these pathways. Maternal susceptibility factors determine the predisposition of the mother to respond to the toxic insult, and the maternal effects can affect the developing fetus adversely. Most chemicals traverse the placenta in some form, and the placenta also can be a target for toxicity. In most cases, developmental toxicity is probably mediated by a combination of these pathways (Prefontaine *et al*., 2005).

It is also very important to keep in mind that toxicants and their teratologic effects show large differences between both inter and intra species. About the *Cyclops* monstrosity in the lambs, the following hypothesis suggested by Strauss (1998) which refers to the cholesterol and Sonic Hedgehog signaling pathway. Within a normal cell, cholesterol is not only a component of the cell membrane or the material used by the body to produce bile acids and hormones; it also influences the Sonic Hedgehog signaling pathway that guides in the development of the embryo. Cholesterol activates and binds the developmental signal-Sonic Hedgehog (Shh) protein, which in turn signals the cell to further development (Strauss, 1998). The teratogenic agents produced by *Veratrum* Species of plants resemble the structure of cholesterol and cause the cell to ignore the Shh signal which results in the failure of the Shh protien controlled genes to turn on and off accordingly (Cooper *et al,*. 1998). Therefore the prevention of DNA replication and cell development occurs. Teratogenic agents also essentially block the normal back and forth movement of sterols from the Endoplasmic reticulum (ER), where cholesterol and the cell membrane is made. The result is a back log of cholesterol on the cell membrane and the lack of cholesterol in the ER, again disrupting the normal signaling pathway for the development of the embryonic cells (Strauss, 1998).

In sheep the most common prevention methods are breeding the ewes 5 weeks prior to let them out for grazing and waiting until after a killing frost (Beasly, 1999).

However, if we accept the Strauss's hypothesis, then the question is that why in the same environment and condition (ewe's uterus), one of the twin lambs grows normally, but the other one develops to *Cyclops* monstrosity.

There was only a difference between the twin lambs in the present case; the *Cyclops* lamb was male and the normal pair was female. Therefore, it seems that the sex or sex-related hormones can protect the embryo (or fetus) from the teratogenic effects of some herbal poisons such as cyclopamine during the critical embryonic (or fetal) growth and developmental period. However, this is just a hypothesis and further investigations are required to explain the real mechanism.

References

Andrabi, A. (2007) Cyclops" two views of this fetal monster delivered by section. In: *http://www.kashvet.org/oasis/?p=112*

Anitei, S. (2008) Cyclops child from India. In: *http://news.softpedia.com/news/See-the-Cyclops-Child-79421.shtml*

Beachy, P. (2005) From Cyclops sheep to cancer drug. In: *http://www.forbes.com/2005/11/11/cx_mh_hedgehogslide.html*

Beasly, V. (1999) *Teratogenic Agents*, International Information Service, Ithaca, N.Y.

Cooper, M., Porter, J., Young, K. and Beachy, P. (1998) Teratogen-mediated Inhibition of Target Tissue Response to Shh Signaling. *Science* **280**, 1603-1607.

Fidler, J., Chamberlain, G.V.P., Ellis, C.E.G., Pryse-Davis, J. and Swiet, M.d. (1983) Cyclops abnormality associated with maternal diabetes mellitus. *Journal of Obstetrics and Gynaecology* **3**, 179-180.

Gaffield, W. and Keeler, R.F. (1996) Steroidal Alkaloid Teratogens: Molecular probes for investigation of craniofacial malformation. *Toxin reviews* **15**, 303-326.

Gill, N.S. (2009) Cyclops in Greek Mythology. In: *http://ancienthistory.about.com/od/cgodsandgoddesses/g/Cyclops.htm*

Hughes, K.L., Haughey, k.G. and Hartley, W.J. (2005) Spontaneous congenital developmental abnormalities observed at necropsy in a large survey of newly born dead lambs. *Teratology* **5**, 5-10.

Lucian, N. (2006) Cyclops cat. In: *http://news.yahoo.com/news?tmpl=story&u=/060109/480/nyet27501091906*

Pescovitz, D. (2008) Piglet with monkey's face/Holoprosencephaly/ Homer's Cyclops. In: *Pescovitz, D. (2008): Piglet with monkey's face/Holoprosencephaly/ Homer's Cyclops. Online: http://boingboing.net/2008/0728/pig-with-monkey-face.html*

Prefontaine, C., Vogelaar, A., Herman, L. and Cindy (2005) Teratology In: *www.uleth.ca/bio/biology3850n/ter.pdf*

Schmutz, S. (2003) Teratogenic Inheritance. In: *http://skyway.usask.ca/~schmutz/Teratogenic.html*, February 3, 2003 edn.

Strauss, E. (1998) One eyed Animals Implicate Cholestrol in Development. *Science, New series* **280**, 1528-1529.

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اولین گزارش تولد یک بره مبتلا به ناهنجاری مادرزادی سیکلوپس دو قلو با یک بره سالم از ایران

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چکیده

یک میش چهار ساله از نژاد مغانی بدلیل وجود سخت زائی به بخش مامایی درمانگاه دام های بزرگ دانشگاه تبریز ارجاع داده شد. بعد از معاینات دقیق مامائی مشخص گردید که دام مبتلا به پرولاپس واژن بوده وسرویکس نیز بسته است و امکان زایمان طبیعی وجود ندارد. لذا، جهت نجات حیوان و بره (های) او تصمیم به انجام عمل سزارین گرفته شد. بعد از مقید ساختن حیوان بر روی پهلوی راست، عمل جراحی از رهیافت ناحیه پائینی پهلوی چپ، تحت شرایط بی حسی موضعی (تزریق خطی و زیرجلدی۱۰ میلی لیتر لیدوکائین ۲٪ ساخت انستیتو پاستور ایران) انجام گرفت. به محض بریده شدن دیواره رحم، یک بره ماده سالم به همراه یک بره نر مرده و عجیب الخلقه از رحم میش به بیرون کشیده شدند. بر اساس تغییرات مشاهده شده درصورت (داشتن فقط یک چشم در وسط صورت) ناهنجاری از نوع سیکلوپس تشخیص داده شد. این گزارش، اولین مورد در خصوص تولد یک بره سیکلوپس دو قلو با یک بره طبیعی از ایران و سایر کشورها می باشد.

واژگان کلیدی: سیکلوپس، ناهنجاری مادرزادی، میش مغانی